

DEUTZ

Press Conference

bauma 2019



Munich, 9 April 2019



STRATEGY



Dr Frank Hiller
CEO



**WE ALL WANT
CO₂-FREE MOBILITY**

GLOBAL CHALLENGES

WHAT DRIVES US



4.5 degree Celsius
global warming if we
don't counteract

- Reduction of CO₂-emissions to be supported by stricter legislation
- Increasing demand for sustainable technology

GLOBAL WARMING



- Over 10 billion people on our planet by 2050
- Above 60% of world population will live in cities by 2030
- Increasing demand for infrastructure & agricultural products
- Increasing need for clean & noise reduced mobile machinery

WORLD POPULATION GROWTH



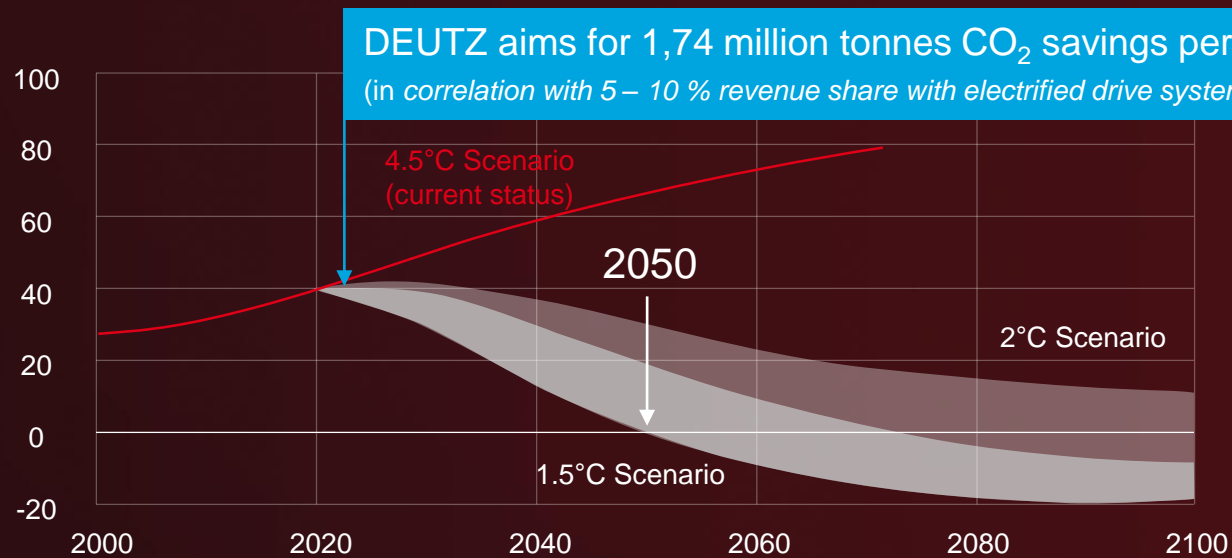
STRONG DEMAND FOR LOW EMISSION DRIVE SYSTEMS & SUSTAINABLE FUELS

GLOBAL WARMING

EVERY GRAM CO₂ COUNTS



Global greenhouse gas emission // Gt CO_{2,eq} / a



Source: van Vuuren et. al. (2017), Rogelj et. al. (2017), Schaeffer et. al. (2015)

NEED FOR ACTION

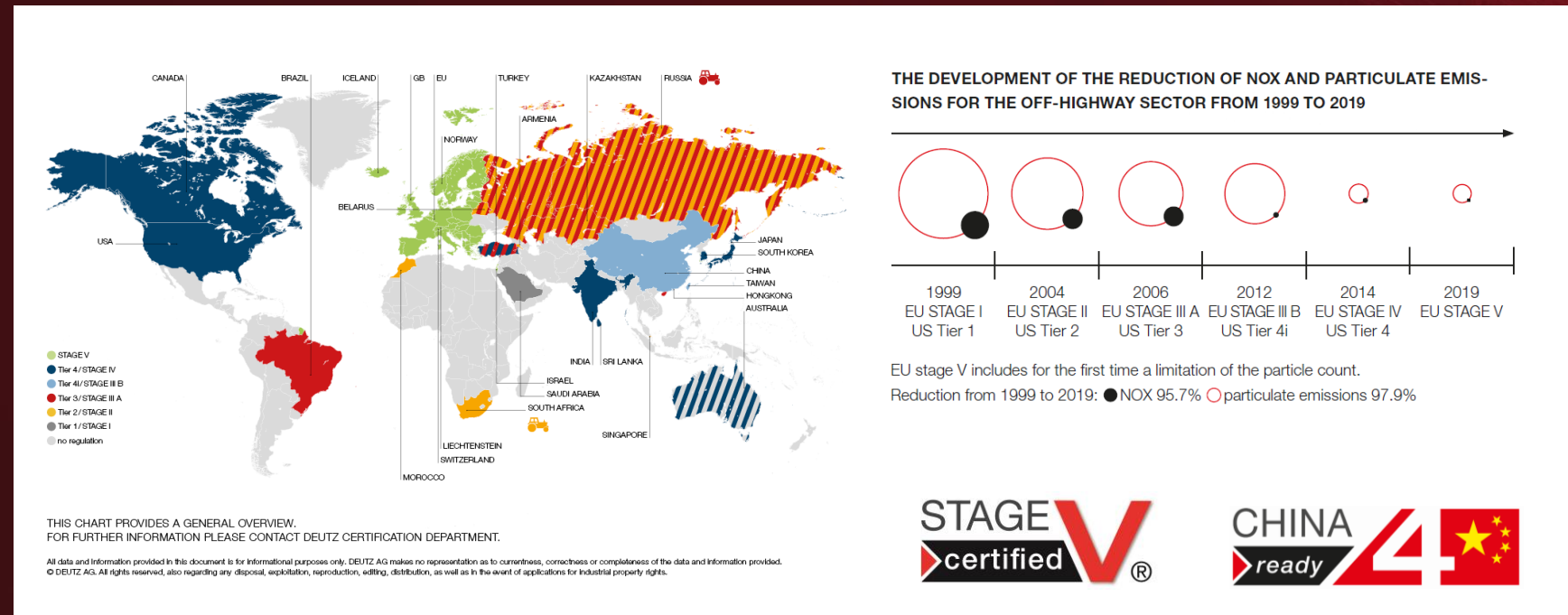
To counteract global warming a consequent reduction of CO₂-emissions is necessary

STRICTER EMISSION STANDARDS

STRONG DEMAND FOR CLEAN DRIVE SYSTEMS



- DEUTZ engines already fulfill global emission standards
- DEUTZ was the 1st “Stage V certified” manufacturer
- Growth opportunities due to technical leadership



DEUTZ SOLUTIONS

ADVANCED DRIVE SYSTEMS FOR SUSTAINABLE POWER



BIODIESEL



MULTI-FUEL



HYDROGEN



SYNTH. FUEL



SUSTAINABLE FUELS

ELECTRIFICATION

PARTICLES -97.9%

NOx -95.7%



48V
MILD HYBRID



360V
FULL HYBRID



BATTERY ELECTRIC
VEHICLE

SUSTAINABLE
FUELS



RENEWABLE
ELECTRICITY

CO₂-NEUTRAL

E-DEUTZ ROADMAP

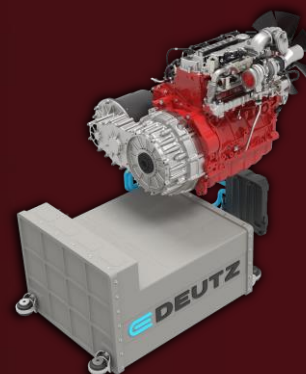
ACCELERATING OFF-HIGHWAY ELECTRIFICATION



2017
Acquisition of
Torqeedo



2019
Modular
Product Kit



2021
Start of rollout,
first relevant revenue



2018
Building up hybrid &
fully electric prototypes

2020
Marketable hybrid &
fully electric products

2022
5 to 10% revenue share with
electrified drive systems

POWER TO X

DEUTZ COMBUSTION ENGINES CAN ALREADY DRIVE CO₂-FREE



DEMAND FOR
E-FUELS
TO INCREASE

LPG,CNG, BI-FUEL



DEUTZ MULTI-FUEL



DIESEL



DEUTZ DIESEL



HYDROGEN



DEUTZ HYDROGEN ENGINE



CO₂-NEUTRAL

DEUTZ ADVANCED CONFIGURATOR

SCALABLE & CUSTOMIZED SOLUTIONS FOR IDEAL DRIVE SYSTEMS



- Revolutionary, modular system to satisfy a broader range of needs
- Customizing of diesel, gas, hybrid and electric drives to match customer requirements
- Precisely fitting to the machine
- Nearly infinite number of solutions for all sizes, power requirements, modes of action and emission standards



REVOLUTIONIZING POWER

DEUTZ STANDS FOR

A glowing circular graphic with a blue and red aura, resembling a lens flare or a stylized planet, framing the text.

PIONEERING
SPIRIT
PASSION
INNOVATION



WE DELIVER
**ADVANCED
DRIVE SYSTEMS**
FOR THE FUTURE!

BAUMA PRODUCT HIGHLIGHTS



Dr Markus Müller
Senior Vice President
Product Development &
Technical Customer Support

DEUTZ TCD 2.2

- max. 55,4kW | 74hp
at 2600min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



DIESEL

DEUTZ TCD 3.6

- max. 105kW | 141hp
at 2300min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



DIESEL

DEUTZ TCD 5.2

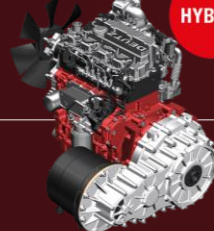
- max. 170kW | 228hp
at 2300min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



DIESEL

DEUTZ

- DEUTZ TCD 2.9 56kW | 75hp
- E-Motor 55kW | 74hp
- Modular Battery 42kWh



HYBRID

DEUTZ TCD 7.8 H2

- max. 180kW | 241hp
at 1900min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



HYDRO-
GEN

DEUTZ TCD 6.1

- max. 180kW | 241hp
at 2300min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



DIESEL

DEUTZ TCD 9.0

- max. 300kW | 402hp
at 2100min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



DIESEL

DEUTZ TCD 13.5

- max. 450kW | 604hp
at 2100min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



DIESEL

DEUTZ G 2.2

- max. 42kW | 56hp
at 2800min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



GAS

DEUTZ G 2.9

- max. 54kW | 72hp
at 2800min⁻¹ | rpm
- EU STAGE V/US EPA Tier 4



GAS



DEUTZ ADVANCED DRIVE SYSTEM Exhibits @ BAUMA 2019

DEUTZ TCD 5.2 AND G 2.2

EFFICIENT AND CLEAN COMBUSTION POWER



TCD 5.2



- Strongest four cylinder Diesel in its class (up to 170 kW)
 - First DEUTZ in-line engine without exhaust gas recirculation (EGR)
 - High SCR efficiency for EU Stage V
 - Common platform with DEUTZ TCD 7.8 features extensive synergy effects and proven technology
-
- Three cylinder LPG engine (up to 42 kW)
 - Three-way catalytic converter for EU Stage V
 - Diesel and gas engine platform: TCD/G 2.2/2.9
→ customers will benefit from extensive synergies
 - Target applications: material handling & compact construction equipment

G 2.2

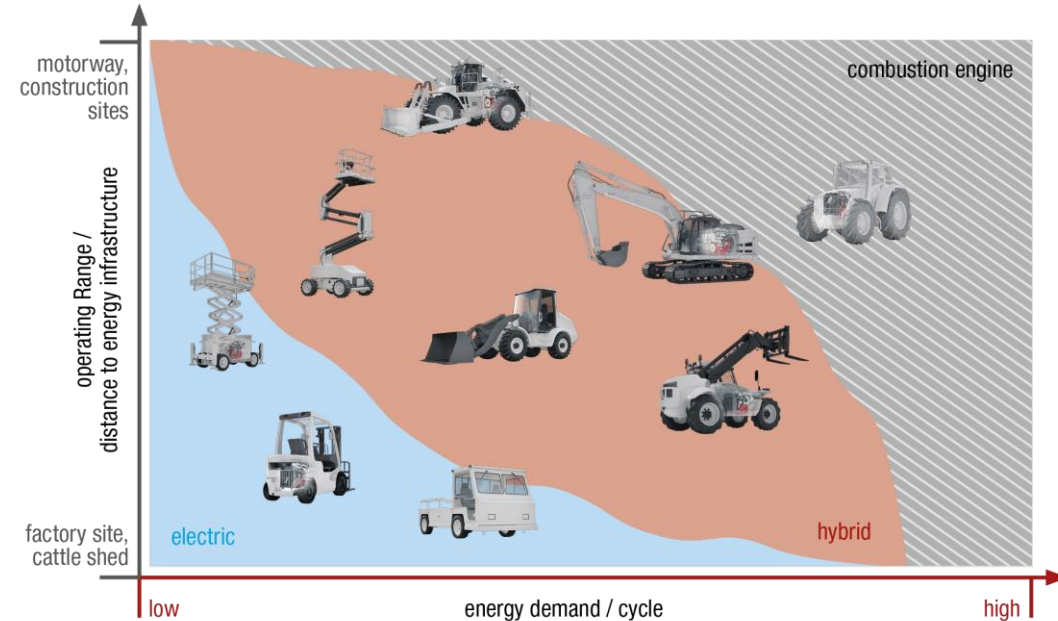


DEUTZ TARGET APPLICATIONS

TAILOR-MADE DRIVE SYSTEMS FOR EVERY SCOPE OF APPLICATION



- Customized drive system depends on work cycle and power requirements
- Battery Electric system for low load and urban use
- Hybrid Electric system for medium load and versatile use
- Combustion engines for high load-operations and autonomy



FIRST CUSTOMER DEUTZ PROTOTYPES

SHOW CASE TELEHANDLER: HYBRID



- Downsizing TCD 3.6 (75 kW) to TCD 2.2 (55.4 kW) plus electric motor (20 kW @ 48V)
- Electric motor linked via hybrid gear box
- High torque transmission
- Flexible mounting
- Fuel saving up to 15%
- ROI within 2 years possible

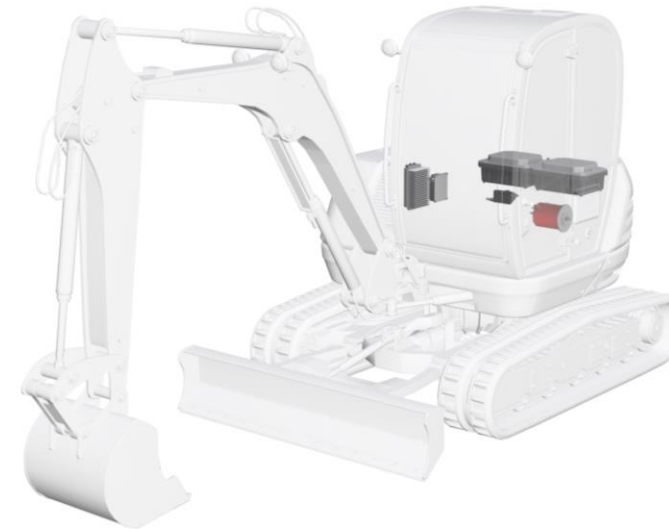


FIRST CUSTOMER DEUTZ PROTOTYPES

SHOW CASE EXCAVATOR: BATTERY ELECTRIC



- Integration of 360V split E-DEUTZ drive system
- Modular battery package (42kWh)
- High efficient drive system
- Zero emissions



FIRST CUSTOMER DEUTZ PROTOTYPES

FUNCTIONAL SYSTEMS DEMONSTRATE EFFICIENT PERFORMANCE



Demonstration
under real-life
operating conditions
at bauma 2019 / FN 1215

Prototype machines
from E-DEUTZ
customer projects



MANITOU
GROUP



KOBELCO



JLG

DEUTZ MARKET POSITIONING

MODULAR PRODUCT KIT



DEUTZ Modular Product Kit offers maximum standardization to fit customers applications

DEUTZ Modular Product Kit is the base for future machinery architecture

DEUTZ scalable combustion engines, electric motors, battery sizes & packages allow to individualize along applications

DEUTZ Modular Product Kit supports downsizing on combustion engine



19 kW	37 kW	56 kW	75 kW	100 kW	150 kW	200 kW
DIESEL	GAS		HYBRID	ELECTRIC		
CLEAN DIESEL	CLEAN FUELS					
TCD 3.6						
G 2.9 TCD 2.9						
G 2.2 TCD 2.2						
DIESEL	GAS					
75kW	Stage V: DPF + SCR Tier 4: DOC + SCR					
<56kW	Stage V/CN IV: DPF Tier 4: DOC					
			48V	360V		
			5 – 20	15 – 168		
			BATTERY Capacity (kWh)			
			< 20	20 – 100		
			E-MOTOR (kW)			
			1.2	2.2	2.9	3.6
			COMBUSTION Engine (displacement in L)			
			HYBRID	ELECTRIC		
			ZERO EMISSION Mode	ZERO EMISSION		
			Simplified EAT			
			Optimized Dynamic + Consumption			

Disclaimer:

This presentation contains forward-looking statements that are subject to various risks and uncertainties. Future results could differ materially from those described in these forward-looking statements due to certain factors, e.g. changes in business, economic and competitive conditions, regulatory reforms, foreign exchange rate fluctuations, uncertainties in litigation or investigative proceedings, and the availability of financing. DEUTZ does not undertake any responsibility to update the forward-looking statements in this presentation.